

CLAIMS

What is claimed is:

- 1 1. An independent display system for a computer aided detection
2 (CAD) system that analyzes medical images, the independent display system
3 comprising:
4 an input mechanism to receive an identifier for a medical image;
5 a touch screen to display the medical image including any marked regions
6 of interest;
7 a plurality of icons to interact with the touch screen, such that the
8 independent display system does not require a keyboard or cursor controller.
- 1 2. The independent display system of claim 1, wherein the input
2 mechanism is a barcode scanner.
- 1 3. The independent display system of claim 1, wherein the input
2 mechanism is a camera.
- 1 4. The independent display system of claim 1, wherein the input
2 mechanism is a microphone and a voice recognition system.
- 1 5. The independent display system of claim 1, wherein the input
2 mechanism is selected from among the following: a keyboard, a limited keyer, a
3 mouse, a trackball, a pen.

1 6. The independent display system of claim 1, wherein the
2 independent display system is modality independent.

1 7 The independent display system of claim 1, wherein the screen of
2 the independent display system is designed to be placed in proximity to a film
3 viewer, and is operable with existing film viewers.

1 8. The independent display system of claim 1, wherein one of the
2 plurality of icons is a layout indicator shown on the display indicating a lightbox
3 to which a currently displayed medical image corresponds.

1 9. The independent display system of claim 8, wherein the image
2 remains associated with the lightbox on the layout indicator, such that previous
3 images are recalled by selecting the appropriate lightbox.

1 10. The independent display system of claim 8, wherein the layout
2 indicator comprises:
3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 11. The independent display system of claim 8, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 12. The independent display system of claim 11, further comprising:

2 a number of preset potential layouts among which the user can choose.

1 13. The independent display system of claim 12, further comprising:
2 a programming logic permitting the user to create a customized layout
3 indicator.

1 14. The independent display system of claim 8, wherein the user selects
2 the lightbox on the touch screen by touching the appropriate light box when an
3 image is called up.

1 15. The independent display system of claim 1, wherein one of the
2 plurality of icons is a printer icon, permitting the user to print the medical
3 images including any marked regions of interest.

1 16. The independent display system of claim 15, wherein the printer
2 icon is present when the printer is enabled and connected to the system.

1 17. The independent display system of claim 15, wherein the printer
2 icon indicates whether the printer is available for use, offline, or out of paper.

1 18. The independent display system of claim 1, wherein one of the
2 plurality of icons is a display adjustment icon, permitting the user to adjust a
3 quality of the medical images displayed.

1 19. The independent display system of claim 18, wherein the display
2 adjustment icon includes a plot of the display adjustment, indicating the
3 adjustment made.

1 20. The independent display system of claim 18, wherein the display
2 adjustment icon is a brightness and contrast icon, permitting the user to adjust
3 the brightness and the contrast of the image.

1 21. The independent display system of claim 20, wherein the
2 brightness and contrast icon further includes a reset area, such that when the
3 reset area is pressed by the user, the brightness and the contrast are reset to their
4 original values.

1 22. The independent display system of claim 18, wherein the display
2 adjustment icon is a gamma icon permitting the user to increase and decrease the
3 gamma of the image.

1 23. The independent display system of claim 22, wherein the gamma
2 icon further includes a reset area, such that when the reset area is pressed by the
3 user, the gamma value is reset to the original value.

1 24. The independent display system of claim 1, further comprising a
2 delay mechanism to delay displaying the image.

25. The independent display system of claim 24, wherein the delay mechanism may be disabled.

26. The independent display system of claim 1, further comprising an auto load mechanism to permit review of a preprogrammed series of images.

27. The independent display system of claim 26, wherein one of the icons is a series movement icon to show a selected image in the series.

28. The independent display system of claim 1, further comprising a historical review to show historical images of the same modality and the same patient as the current image.

29. The independent display system of claim 28, wherein a set of the plurality of icons are icons permitting navigation among the historical images.

30. The independent display system of claim 29, wherein the set of icons include a current image icon, a baseline image icon, and navigation icons to navigate a plurality images between the current image and the baseline image.

31. The independent display system of claim 28, further comprising a loading logic to identify a patient and modality based on the identifier of the medical image, and to load the appropriate historical images in response to a user request.

1 32. The independent display system of claim 1, further comprising a
2 loading unit to identify a patient associated with the medical image and to load
3 relevant patient information.

1 33. The independent display system of claim 32, wherein the patient
2 information is patient data and patient history data.

1 34. The independent display system of claim 32, further comprising:
2 the touch screen to display the patient information.

1 35. The independent display system of claim 32, further comprising a
2 disabling logic to disable the loading unit from loading the patient information.

1 36. The independent display system of claim 32, wherein one of the
2 icons is a toggle to display patient information.

1 37. An independent display system for a computer aided detection
2 (CAD) system, the independent display system comprising:
3 a display;
4 a user interface to permit a user to interact with the display;
5 a layout indicator shown on the display indicating a lightbox to which a
6 currently displayed image corresponds.

1 38. The independent display system of claim 37, wherein the layout
2 indicator comprises:

3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 39. The independent display system of claim 37, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 40. The independent display system of claim 39, further comprising:
2 a number of preset potential layouts among which the user can choose.

1 41. The independent display system of claim 40, further comprising:
2 a programming logic permitting the user to create a customized layout
3 indicator.

1 42. The independent display system of claim 37, wherein the display is
2 a touch screen.

1 43. The independent display system of claim 42, wherein the user
2 selects the lightbox on the touch screen by touching the appropriate light box
3 when an image is called up.

1 44. The independent display system of claim 37, wherein the
2 independent display system is modality independent.

1 45. The independent display system of claim 37, wherein the screen of
2 the independent display system is designed to be placed in proximity to a film
3 viewer, and is operable with existing film viewers.

1 46. The independent display system of claim 37, wherein the image
2 remains associated with the lightbox on the layout indicator, such that previous
3 images are recalled by selecting the appropriate lightbox.

1 47. The independent display system of claim 37, further comprising:
2 a printer icon, permitting the user to print the medical images including
3 any marked regions of interest.

1 48. The independent display system of claim 47, wherein the printer
2 icon is present when the printer is enabled and connected to the system.

1 49. The independent display system of claim 47, wherein the printer
2 icon indicates whether the printer is available for use, offline, or out of paper.

1 50. The independent display system of claim 37, further comprising:
2 display adjustment icon, permitting the user to adjust a quality of the
3 medical images displayed.

1 51. The independent display system of claim 50, wherein the display
2 adjustment icon includes a plot of the display adjustment, indicating the
3 adjustment made.

1 52. The independent display system of claim 51, wherein the display
2 adjustment icon is a brightness and contrast icon, permitting the user to adjust
3 the brightness and the contrast of the image.

1 53. The independent display system of claim 52, wherein the
2 brightness and contrast icon further includes a reset area, such that when the
3 reset area is pressed by the user, the brightness and the contrast are reset to their
4 original values.

1 54. The independent display system of claim 51, wherein the display
2 adjustment icon is a gamma icon permitting the user to increase and decrease the
3 gamma of the image.

1 55. The independent display system of claim 54, wherein the gamma
2 icon further includes a reset area, such that when the reset area is pressed by the
3 user, the gamma value is reset to the original value.

1 56. The independent display system of claim 37, further comprising a
2 delay mechanism to delay displaying the image.

1 57. The independent display system of claim 56, wherein the delay
2 mechanism may be disabled.

58. The independent display system of claim 37, further comprising an auto load mechanism to permit review of a preprogrammed series of images.

59. The independent display system of claim 58, wherein one of the icons is a series movement icon to show a selected image in the series.

60. The independent display system of claim 37, further comprising a historical review to show historical images of the same modality and the same patient as the current image.

61. The independent display system of claim 60, wherein a set of the plurality of icons are icons permitting navigation among the historical images.

62. The independent display system of claim 61, wherein the set of icons include a current image icon, a baseline image icon, and navigation icons to navigate a plurality images between the current image and the baseline image.

63. The independent display system of claim 60, further comprising a loading logic to identify a patient and modality based on the identifier of the medical image, and to load the appropriate historical images in response to a user request.

64. The independent display system of claim 37, further comprising a loading unit to identify a patient associated with the medical image and to load relevant patient information.

1 65. The independent display system of claim 64, wherein the patient
2 information is patient data and patient history data.

1 66. The independent display system of claim 64, further comprising:
2 the touch screen to display the patient information.

1 67. The independent display system of claim 64, further comprising a
2 disabling logic to disable the loading unit from loading the patient information.

1 68. The independent display system of claim 37, further comprising a
2 toggle to display patient information.

1 69. A computer aided detection (CAD) system that analyzes medical
2 images comprising:
3 an image acquisition system to acquire a digitized medical image and
4 associate an image ID with the image;
5 an analysis system to identify regions of interest (ROIs);
6 a display mechanism to display the unmarked medical images; and
7 an independent display, independent from the analysis system, the
8 independent display comprising:
9 an input mechanism to receive the image ID and identify the
10 medical image associated with the image ID;
11 a screen to display the medical image including any marked
12 regions of interest;

13 a plurality of icons to interact with the medical images on
14 the screen.

1 70. The CAD system of claim 69, wherein one of the plurality of icons
2 is a layout indicator shown on the display indicating a lightbox to which a
3 currently displayed medical image corresponds.

1 71. The CAD system of claim 70, wherein the layout indicator
2 comprises:
3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 72. The CAD system of claim 71, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 73. The CAD system of claim 69, wherein one of the plurality of icons
2 is a printer icon, permitting the user to print the medical images including any
3 marked regions of interest.

1 74. The CAD system of claim 73, wherein the printer icon indicates
2 whether the printer is available for use, offline, or out of paper.
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1 75. The CAD system of claim 69, wherein one of the plurality of icons
2 is a display adjustment icon, permitting the user to adjust a quality of the
3 medical images displayed.

1 76. The CAD system of claim 69, further comprising a delay
2 mechanism to delay displaying the image.

1 77. The CAD system of claim 69, wherein the delay mechanism may be
2 disabled.

1 78. The CAD system of claim 69, further comprising an auto load
2 mechanism to permit review of a preprogrammed series of images.

1 79. The CAD system of claim 69, wherein one of the icons is a
2 Next/Done icon to show a next image in the series.

1 80. The CAD system of claim 69, further comprising a historical review
2 to show historical images of the same modality and the same patient as the
3 current image.

1 81. The CAD system of claim 80, wherein a set of the plurality of icons
2 are icons permitting navigation among the historical images.

1 82. The CAD system of claim 81, wherein the set of icons include a
2 current image icon, a baseline image icon, and navigation icons to navigate a
3 plurality of images between the current image and the baseline image.

1 83. The CAD system of claim 69, further comprising a loading logic to
2 identify a patient and modality based on the identifier of the medical image, and
3 to load the appropriate historical images in response to a user request.

1 84. The CAD system of claim 69, further comprising a loading unit to
2 identify a patient associated with the medical image and to load relevant patient
3 information.

1 85. The CAD system of claim 84, wherein the patient information is
2 patient data and patient history data.

1 86. The CAD system of claim 69, wherein one of the icons is a toggle to
2 show patient information.

1 87. The CAD system of claim 69, further comprising:
2 a frame sensor to monitor a motion of the display mechanism of a
3 motorized viewer in which patient image data is divided into frames, where
4 adjacent frames may contain image data from different patients, the frame sensor
5 to pass a frame data to the input mechanism of the independent display.

1 88. A method of displaying medical images from a computer aided
2 diagnostic (CAD) system comprising:
3 identifying a medical image based on an image identification;
4 identifying a lightbox for the image and highlighting the identified
5 lightbox on a lightbox icon;
6 displaying the image to the user.

1 89. The method of claim 88, further comprising:
2 displaying a plurality of lightbox icons for selection, and prompting the
3 user to select a lightbox layout corresponding to an actual layout at a current
4 location.

1 90. The method of claim 88, further comprising:
2 displaying a printer icon indicating whether the printer is connected or
3 not.

1 91. The method of claim 88, further comprising:
2 receiving an image adjustment signal from the user, and adjusting the
3 image quality of the medical image.

1 92. The method of claim 91, wherein the image adjustment signal is a
2 brightness and/or contrast adjustment.

1 93. The method of claim 91, wherein the image adjustment signal is a
2 gamma adjustment.

1 94 The method of claim 91, further comprising:
2 receiving a reset signal, in response to the user pressing a single selection,
3 and resetting the image quality to the original image quality in response to the
4 reset signal.

1 95. The method of claim 88, further comprising:
2 receiving an advance sequence signal indicating that the user has
3 completed review of the current medical image; and
4 displaying a subsequent medical image in a preprogrammed series in
5 response to the advance sequence signal.

1 96. The method of claim 88, further comprising:
2 receiving a request for a historical image;
3 identifying a patient and modality displayed in the current medical
4 image; and
5 retrieving images of the same patient and the same modality, if available.

1 97. The method of claim 96, further comprising:
2 enabling navigation among the historical images, including displaying a
3 current image icon, a baseline image icon, and navigation icons to navigate a
4 plurality images between the current image and the baseline image.

1 98. The method of claim 88, further comprising:
2 identifying a patient based on the image identification;

3 loading relevant patient information; and
 4 indicating to the user that the patient information is available.

1 99. The method of claim 88, wherein the method is modality
 2 independent.

1 100. The method of claim 88, wherein the image remains associated with
 2 the lightbox on the layout indicator, such that previous images are recalled by
 3 selecting the appropriate lightbox.

1 101. The method of claim 88, further comprising:
 2 displaying a plot of a current image quality indicating the adjustment
 3 made.

1 102. The method of claim 88, further comprising:
 2 waiting a preset delay prior to displaying the image.

1 103. The method of claim 102, wherein the delay may be disabled.

1 104. The method of claim 88, further comprising a loading unit to
 2 identify a patient associated with the medical image and to load relevant patient
 3 information.

1 105. The method of claim 104, wherein the patient information is patient
 2 data and patient history data.

1 106. The method of claim 104, further comprising a disabling logic to
2 disable the loading unit from loading the patient information.

1 107. The method of claim 104, wherein one of the icons is a toggle to
2 display patient information.

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